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IMPLEMENTATION COMPLETION REPORT  
(CPL-40340 SCL-4034A SCPD-4034S PPFB-P2410)

ON A

LOAN/CREDIT/GRANT

IN THE AMOUNT OF US\$36.4 MILLION

TO THE

DEMOCRATIC AND PEOPLE'S REPUBLIC OF ALGERIA

FOR AN

INDUSTRIAL POLLUTION CONTROL PROJECT

December 30, 2005

## CURRENCY EQUIVALENTS

(Exchange Rate Effective October 2005)

Currency Unit = Algerian Dinar (DA)

DA 1.00 = US\$ 0.014

US\$ 1.00 = DA 72.00

## FISCAL YEAR

January - December 31

## ABBREVIATIONS AND ACRONYMS

ASMIDAL:	<i>Entreprise Nationale des Engrais et Produits Phytosanitaires</i>
BOD :	Biochemical Oxygen Demand
CNP :	<i>Conseil National de la Planification</i>
DGE :	<i>Direction Générale de l'Environnement</i> (General Directorate of the Environment)
EA :	Environmental Assessment
ENSIDER :	<i>Entreprise Nationale de Sidérurgie</i>
EMPA :	Environmental Management Performance Agreement
FEDEP :	<i>Fonds pour l'Environnement et la Dépollution</i>
GOA :	Government of Algeria
HCEDD :	<i>Haut Conseil de l'Environnement et du Développement Durable</i> (High Council for the Environment and Sustainable Development)
HWM :	Hazardous Waste Management
IEW :	Inspectorats de l'Environnement de Wilaya (Wilaya Environment Inspectorates)
MICLE :	Ministère de l'Intérieur, des Collectivités Locales, et de l'Environnement
MIR:	Ministry of Industry and Restructuring
MAP:	Mono-Ammonium Phosphate
MLUPE:	<i>Ministère de l'Aménagement du Territoire et de l'Environnement</i> (Ministry of Land Use Planning and Environment)
MOH:	Ministry of Health
NEAP:	National Environment Action Plan
NEF:	National Environmental Fund
NGO:	Non Governmental Organizations
NOx :	Nitrogen Oxides
NPK:	Nitrogen-Phosphate-Potassium
PAH:	Polycyclic Aromatic Hydrocarbons
PE:	Public Enterprise
PIU:	Project Implementation Unit
QSA:	Quality at Supervision Assessment
SIDER:	<i>Entreprise Nationale de Sidérurgie</i>
SO2:	Sulfur Dioxide
TSP:	Total Suspended Particles
VOC:	Volatile Organic Hydrocarbons
WHO:	World Health Organization

Vice President:	Christiaan Poortman
Country Director	Theodore Ahlers
Sector Manager	Narasimham Vijay Jagannathan

Task Team Leader/Task Manager: Hocine Chalal

**DEMOCRATIC AND PEOPLE'S REPUBLIC OF ALGERIA  
INDUSTRIAL POLLUTION CONTROL PROJECT**

**CONTENTS**

	<b>Page No.</b>
1. Project Data	1
2. Principal Performance Ratings	1
3. Assessment of Development Objective and Design, and of Quality at Entry	2
4. Achievement of Objective and Outputs	5
5. Major Factors Affecting Implementation and Outcome	10
6. Sustainability	11
7. Bank and Borrower Performance	12
8. Lessons Learned	13
9. Partner Comments	14
10. Additional Information	14
Annex 1. Key Performance Indicators/Log Frame Matrix	15
Annex 2. Project Costs and Financing	19
Annex 3. Economic Costs and Benefits	20
Annex 4. Bank Inputs	22
Annex 5. Ratings for Achievement of Objectives/Outputs of Components	24
Annex 6. Ratings of Bank and Borrower Performance	25
Annex 7. List of Supporting Documents	26
Annex 8. Borrower's Project Completion Report	27

Maps: IBRD: 27060R, 27061

<i>Project ID:</i> P004960	<i>Project Name:</i> IND.POLLUTION CTRL.
<i>Team Leader:</i> Hocine Chalal	<i>TL Unit:</i> MNSRE
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> December 28, 2005

## 1. Project Data

*Name:* IND.POLLUTION CTRL.

*L/C/TF Number:* CPL-40340; SCL-4034A;  
SCPD-4034S;  
PPFB-P2410

*Country/Department:* ALGERIA

*Region:* Middle East and North  
Africa Region

*Sector/subsector:* Petrochemicals and fertilizers (45%); Other industry (42%); Central government  
administration (13%)

*Theme:* Pollution management and environmental health (P); Environmental policies and institutions  
(P); Law reform (P)

### KEY DATES

*PCD:* 10/01/1993

*Appraisal:* 05/25/1995

*Approval:* 06/11/1996

*Original*  
*Effective:* 03/19/1997

*MTR:* 10/22/2001

*Closing:* 06/30/2005

*Revised/Actual*

03/19/1997

10/22/2001

06/30/2005

*Borrower/Implementing Agency:* ALGERIAN GOVERNMENT/MINISTRY OF INTERIOR & ENVIRONMENT

*Other Partners:* ASMIDAL Co., SIDER Co.

STAFF	Current	At Appraisal
<i>Vice President:</i>	Christiaan Poortman	Kemal Dervis
<i>Country Director:</i>	Theodore O. Ahlers	Daniel Ritchie
<i>Sector Manager:</i>	Vijay Jagannathan	Mark Wilson
<i>Team Leader at ICR:</i>	Hocine Chalal	Sherif Kamel F. Arif
<i>ICR Primary Author:</i>	Hocine Chalal; Ahmed El-Hamri	

## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

*Outcome:* S

*Sustainability:* L

*Institutional Development Impact:* SU

*Bank Performance:* S

*Borrower Performance:* S

QAG (if available)

ICR

*Quality at Entry:*

S

*Project at Risk at Any Time:* No

### 3. Assessment of Development Objective and Design, and of Quality at Entry

#### 3.1 Original Objective:

According to the Staff Appraisal Report (March 1996), the project's initial broad objective was to assist the Government of Algeria (GOA) in reducing pollution, which was causing health problems and serious ecological degradation. Its specific objectives were to: (1) strengthen the institutional and legal framework; and (b) initiate a pilot investment program to mitigate pollution in the industrial sector of Annaba, situated in the northeastern region of Algeria.

#### 3.2 Revised Objective:

Although the project was revised three times (see section 3.4 below), the original objectives were not modified.

#### 3.3 Original Components:

**Component A: Strengthening of the institutional and legal framework:** This consisted of four subcomponents:

- **The Institution Building Subcomponent**, which consisted of activities aimed at strengthening the technical and administrative capacity of: (i) the *Haut Commissariat à l'Environnement et au Développement Durable* (HCEDD) as the cross-sectoral forum for environmental policies and its sub-commissions, both of which would oversee and review, *inter alia*, the National Environmental Action Plan (NEAP); (ii) *Direction Générale de l'Environnement* (DGE) as the national environmental agency responsible for national policies, NEAP preparation, proposing legislation, and ensuring operational and technical cooperation; (iii) the sector ministries of Industry and Restructuring (MIR) and Health (MOH) and the National Planning Council (*Conseil National de la Planification*- CNP) for assisting in EA and audit preparation in the sectors; preparing health risk assessment (MOH), and environmental planning (CNP); and (iv) the *Inspections de l'Environnement de Wilaya* (IEW) in Annaba, Skikda, Constantine, Algiers, and Oran to undertake monitoring and enforcement activities. This subcomponent also included the promotion and introduction of clean technology.
- **The Enhancement of the Legal and Regulatory Subcomponent** which consisted of activities aimed at providing GOA with the administrative, management, and technical tools to: (i) review, update, and modify the most important legal texts and regulations derived from the framework environmental law and eliminate overlaps and contradictions; (ii) apply the modified Environmental Assessment (EA) decree as an effective policy instrument and develop the appropriate procedures and sector guidelines; (iii) issue and adopt the modified decrees for the classified establishments, including the issuance of environmental permits, training and technical assistance for handling the transport of hazardous waste; and (iv) undertake a study on environmental liabilities.
- **Design and Implementation of a System for Monitoring and Enforcement Subcomponent:** this subcomponent consisted of the design and implementation of an environment permit system on a pilot basis in Annaba and Skikda. Based on the modified decree on classified establishments, an environmental permit would be issued after negotiation between the DGE/IEW and each establishment. This permit would determine a ceiling on the pollution amount that each establishment would be allowed to discharge in a given medium by determining local environmental guidelines, as well as a program (when necessary) for reducing the total pollution load over a specific time, consistent with the technology used and the financial status of each establishment. With this sub-component, DGE and the corresponding IEW should be able to monitor the pollution contracts and test a series of enforcement measures and financial incentives to mitigate pollution in

an integrated manner.

- **The National Environmental Fund (NEF) Subcomponent**, which aimed at making the NEF operational and then expand its role into an effective instrument of environmental financing as a *Fonds de Dépollution et de Protection de l'Environnement* (FDEPE). This subcomponent would finance two studies on activating the NEF and establishing the FDEPE and on the development of economic and financial incentives. It was intended to promote the FDEPE into a financial intermediary that would provide loans and credits from GOA contributions, future Bank loan proceeds, international donors, and environmental taxes and fees whenever they are legally established.

**Component B: Pilot Investments Aimed at Mitigating the Adverse Impact of Industrial Pollution in the Northeast of Algeria:** This component covered environmental investments in the Fertilizer Complex of ASMIDAL and in the Iron and Steel Complex of ENSIDER. These two plants were located in the area of Annaba.

- The investment in the ASMIDAL complex consisted of: (a) dismantling and decontaminating the sulfuric and phosphoric acid plants of ASMIDAL; (b) the provision of phosphoric acid and/or mono-ammonium phosphate to compensate for losses in production; (c) the rehabilitation of the gas treatment system in the nitric acid plant and the granulation units used in the fertilizer production; (d) the installation of a scrubber or a granulator in the ammonium nitrate plant; (e) the rehabilitation of the harbor reception facility in the port of Annaba; (f) the provision of spare parts and materials for the phosphate and nitrogen fertilizers production lines; and (g) support in the areas of plant operation and management, and workers' health and safety standards through technical and management training.
- The investment in the ENSIDER Steel Complex consisted of: (a) the installation of dust removal systems for the electric and blast furnaces and sintering plants, and installations of a suitable door cleaning system in the coke ovens and a boiler for aluminum distillation.; (b) the provision of equipment for the construction of two (2) wastewater treatment plants and the renovation of the existing biological wastewater treatment plant; (c) the provision of laboratory equipment to monitor pollution; (d) the provision of spare parts and materials for the plants; and (e) support in the areas of plant operation and management, and workers' health and safety standards, through technical and management training.

#### *3.4 Revised Components:*

In view of the difficulties resulting from the early institutional instability of the sector, project components were revised on three different occasions during the first half of the implementation period. These changes were considered necessary to adapt to the rapidly changing institutional and economic environment, while retaining consistency with the original project objectives. However, in spite of the difficulties, this process ensured that continuity of implementation enabled achieving the project's objective of decreasing significantly the pollution in one of the most polluted areas in Algeria and in establishing a sound institutional and legal framework for environmental management. In this context, the project became also a means for engaging GOA in a continuous dialogue that proved to be useful for carrying out the needed institutional reforms of the sector with the Bank's assistance.

**A first revision** took place in November 1998 and was aimed at correcting some aspects of the design of the pilot investments components.

**ASMIDAL Pilot Investment:** the provision of phosphoric acid and ammonium phosphate to compensate for losses in production was cancelled from the loan and the installation of a granulator in the ammonium nitrate plant was retained in lieu of the installation of a scrubber. Furthermore, it was also decided to dismantle and cease all operations of the sulfuric and phosphoric acid plants in lieu of their decontamination. This project revision kept all other activities.

**ENSIDER Pilot Investment:** the project revision eliminated the installation of a dust removal system for the electric and blast furnaces and sintering plants, and the installation of a suitable door system in the coke ovens and a boiler for ammonium distillation. However, the project opted instead to install dust removal systems for the coke ovens and blast furnaces, and installation of equipment for ammonium distillation and desulphurization. All other activities were kept.

**The second significant project revision** took place in May 2002. It aimed at canceling remaining funds from the loan for the ASMIDAL and SIDER components at the request of the two companies. The two companies having decided to carry out the agreed environment pollution abatement program using other sources of funding (ASMIDAL's financial situation was becoming increasingly more comfortable due to increase of Ammonia price on the world market, and SIDER was in the process of negotiating a take-over from an international steel manufacturing conglomerate – LNM Steel). Taking advantage of the revision of the project scope, the Ministry of Environment requested re-allocating a portion of the cancelled amount for the implementation of a component that had been pre-appraised and which was to be financed by GoA following agreement made during negotiations. This component consisted of establishing a pilot hazardous waste treatment facility, by financing costs of works, provision of technical assistance, purchase of collection and treatment equipment, including the preparation of an environmental impact assessment and relevant technical, economic and engineering studies for the establishment, operation and supervision of the waste facility. As for the components of the pilot investments, they were redefined according to the activities already completed. The activities that had not yet been implemented were to be financed by the companies themselves.

The impact of this revision of the project scope on the loan amount and structure was the following: US\$ 41.4 million was cancelled from the loan representing the cost of remaining activities which were part of component B. However, it was agreed that ASMIDAL as well as SIDER (through the newly created entity, after LNM take over) would stay committed towards the originally planned environmental investment activities and objectives using their own funds. This cancellation left a total of US\$ 36.6 million corresponding to the previously disbursed activities under component B, financed activities under component A, of which US\$ 10.5 million was allocated for the financing of the hazardous waste subcomponent.

As the main mitigating measures for ensuring the sustainability of the project outcomes and the achievement of the project objectives, performance agreements were established between both ASMIDAL and SIDER with the Ministry of Environment. These performance agreements were implemented as means to ensure that ASMIDAL-FERTIAL and ENSIDER-ISPAT would continue to implement industrial pollution abatement in accordance with their initial commitments to the Project objectives. These performance agreements were essentially a voluntary process through which the Ministry of Environment could monitor progress in emission reduction in the two companies in return for a commitment to assist these companies through various ways. This approach proved attractive as fairly quickly thereafter about twenty five companies decided to engage in the same type of agreements with the Ministry of Environment. During the negotiation process leading to these agreements, it was made clear that this approach was not intended at replacing enforcement action based on the current environmental protection law, but rather to



complement the latter in a cost effective manner.

### *3.5 Quality at Entry:*

**Quality at entry is rated as satisfactory.** The project was developed under an interim assistance strategy of the Bank for Algeria (the 1996 CAS was a one-year strategy) which aimed at addressing urgent sectoral issues considering the political and institutional situation prevailing at the time. The project's overall objective was consistent with the 2003 CAS that identified two main strategic objectives; (i) improved business environment and (ii) public service delivery. The project was a catalyst for the delivery of institutional and sectoral reforms as well as an adequate framework to implement result-oriented environmental management tools on the institutional and operational sides of the sector.

The project was developed on the basis of a thorough analysis of the sector strategy. The technical and institutional design was based on an institutional and legal assessment of the sector, on a pollution loads assessment and on health impact assessments. These studies indicated that pollution, from public sector industries on the northeastern coast and located, in particular, in or around the cities of Annaba and Skikda, was a major problem that needed to be urgently addressed, especially given its impact on human health. The environmental investments component was considered essential to the project as it had the potential for demonstrating the necessary link between environmental management and concrete actions on the ground aimed at reducing industrial pollution. Furthermore, these investments proved to be positive test cases and learning experiences for other similar investments. In addition, policy and institutional assessment were also carried out during project preparation, which led to the approval of a National Environmental Action Plan (NEAP) for Algeria.

In retrospect, the initial design of the project may have been overly ambitious as it included groundbreaking institutional reforms coupled with physical environmental investments, which had never been done in Algeria. Nevertheless, the approach followed did recognize explicitly the risks involved with regard to the project implementation challenges at a time when Algeria was entering a phase of reforms and when institutions and government agencies were in a transitional phase. Given the project's complex design, it took GOA some time to build adequate ownership as the institutions in charge of environmental policy and management were being established at the same time. The project environment was further rendered difficult because of the civil strife situation during the 1990's that did not allow for strong and consistent counterpart's commitment. Relatively more stable project management conditions were reached only in 2001 with the establishment of a Ministry of Land Use Planning and Environment (*MLUPE*) which has been retained through every government changes since then.

## **4. Achievement of Objective and Outputs**

### *4.1 Outcome/achievement of objective:*

**Achievement of DO is rated as satisfactory.** Overall, project implementation has resulted in the achievement of the initial objectives. The legal and institutional framework has been significantly improved and most of the pollution abatement measures were completed under the project. Industrial pollution in the northeast of Algeria has been considerably curtailed. Air pollution in the Annaba region has been improved as emissions have been reduced leading to significant improvement in ambient air quality, as measured for the most exposed city of El Bouni, by up to 56 % for PM10, 89% for SO2 and 98% for NOx. Health surveys of respiratory morbidity before and after the project implementation have shown a decrease by 25% and 46% respectively for respiratory illness and for asthma in downtown Annaba. The impact is even greater in the more exposed cities of El Bouni and Sidi Amar which show an improvement on asthma morbidity rate of, respectively 83% and 78%.

Specific Objectives related to the pilot investments have also been achieved and **their outcome is considered as satisfactory.**

**Project Activities carried out by ASMIDAL** have resulted in a significant reduction of air emissions as well as wastewater discharges. These are as follows:

- (i) The rehabilitation of the nitric acid plant helped in significantly reducing air emissions, which are currently under control and are well below accepted norms. NO<sub>x</sub> emissions are below 300mg/Nm<sup>3</sup> and dust emissions are at less than 50mg/Nm<sup>3</sup>;
- (ii) The installation of new production process at the ammonium nitrate plant reduced NO<sub>x</sub> emissions to less than 150 ppm, ammonia emissions to less 50mg/Nm<sup>3</sup>, and fluorine emissions to less than 5mg/Nm<sup>3</sup>;
- (iii) Wastewater discharge indicators show that suspended solids are less the 30mg/l, oxygen load is less than 120 mg/l, fluorine is at less than 20mg/l and, ammonia is at less than 10mg/l.; and
- (iv) Discontinuation of phosphogypsum discharges in the Bay of Annaba by an amount of 288,000 tons per year.

**Project Activities that were implemented by ENSIDER** have also resulted in an important reduction of its pollution loads. These are as follows:

- (i) Dust emissions from the blast furnace and steelworks are presently at less than 50mg/Nm<sup>3</sup> and particulate load is less than 0.15 Kg/ton;
- (ii) The installation of an ammonia distillation and incineration system helped achieve a reduction of nitrogen oxide to less than 6 Kg/ton of coke output. Benzene is at less than 0.1 Kg/ton of coke output and organic compounds are at less than 0.3 Kg/ton of coke output and 20 mg/Nm<sup>3</sup>; and
- (iii) Wastewater discharge indicators reveal that suspended solids are less than 30mg/l, oils less 20mg/l.

**The effort towards strengthening the legal and institutional framework** has resulted in a more comprehensive regulatory framework and in the establishment of reliable institutional functions and departments. In addition, the project was a catalyst for the implementation of a coherent environmental and sustainable development policy through the introduction of the concept of integrated pollution control approach, and for the improvement of the legal basis of the national environmental fund. Other achievements include training and human resource development, the development of a national environmental knowledge base, the establishment of reference laboratories and air monitoring networks in the cities of Algiers and Annaba, and the establishment of an environmental information system.

Although the project had undergone two significant revisions, the achievement of initial objectives has not been compromised. In addition, the substance of the objective that had been initially sought was achieved, and a positive learning experience ensued from project implementation. Consequently, even with the cancellation of US\$ 41.4 million, the project produced positive results and outcomes consistent with the initial objectives. This feature was recognized by the QAG/QSA review of the project in 2004.

#### *4.2 Outputs by components:*

**Component A1: Legal and Institutional Component: Implementation rating: satisfactory.**

**Institutional Strengthening Subcomponent: rated satisfactory:** Completion of this subcomponent has resulted in strengthening the institutional capability of MLUPE in key areas of environmental management:

- (i) ***Environmental Regulation Enforcement*** has been strengthened through the establishment of reliable institutional functions and departments such as the Environment General Directorate, 48

regional inspection departments (Inspections de Wilaya) and the establishment, within the industrial environment policy department of the Ministry, of a unit specialized in the development, implementation and monitoring of more than twenty-five (25) environmental management performance agreements;

(ii) ***Environmental Policy:*** The project has also helped in the development of a coherent environmental and sustainable development policy the preparation of a *Sustainable Development and National Environment Action Plan (NEAP-SD)*, which was formally adopted by the government. Furthermore, it helped strengthen the linkages between the environment and the economic/productive sectors through the creation of fiscal incentives for the disposal of solids and hazardous waste as well as through the establishment of an Environment and Pollution Abatement Fund (FEDEP);

(iii) ***Training and Human Resource Development :*** 363 sector professionals were trained in the areas of environmental management.

(iv) ***Development of a National Environmental Knowledge Base:*** This component strengthened the expertise of MLUPE and helped in the formulation of sectoral policies such as solid waste management, environmental accountability and liability, environmental audits of areas at risk (Oued El Harrach Basin, Oued Seybouse Basin) and of industrial plants (Ghazaouet Zinc factory and several Cement Plants);

(v) ***Monitoring capacity:*** This area was strengthened through the establishment of three (03) Reference Laboratories in Algiers, Oran, and Constantine as well as regional air quality monitoring networks (SAMASAFIA) in Algiers and Annaba. In addition, four (04) wilaya laboratories were set-up for the purposes of monitoring environmental quality. Furthermore, *an Environmental Information System* was also established at the MLUPE.

**Enhancement of the Legal and Regulatory Framework subcomponent: rated satisfactory**

Completion of this subcomponent has resulted in the strengthening of the legal and regulatory framework through (i) the adoption of three (03) new laws including an environmental protection law (Law No 3 of July 19, 2003), which clearly restated environmental protection within the framework of sustainable development, a decree on environmental liability, and a law on solid waste disposal. In addition, two (02) decrees were drafted for the classification of all plants and facilities, and for environmental impacts assessments. Furthermore, an industrial pollution control system based on environmental management performance contracts (EMPA) was implemented.

***Development of an Integrated Pollution Control System Subcomponent:*** Completion of this component was achieved only for the city of Annaba and has resulted in: (i) The acquisition and installation of an air quality-monitoring network; (ii) The implementation of a permit system needed to determine and monitor emissions restrictions for polluting facilities; and (iii) The implementation of EMPAs for ASMIDAL and ENSIDER.

***National Environmental Fund Subcomponent (NEF):*** The NEF was expanded to include the authority to finance investments in the areas of environmental cleanup and protection. A comprehensive study was carried in order to determine the ways and means to amend and improve the NEF into a pollution abatement fund within the national budget process.

### ***Component A2: Hazardous Waste Management Component (HWM)***

Although this component has not been completed, **the likely outcome related to this component is rated satisfactory**. Indeed, detailed studies have been finalized under the project. These have been used as a basis to draft bidding documents for civil works and equipment supply. The costs associated with these activities will be financed by MLUPE/GOA's funds and the Bank would continue to provide limited assistance and advisory services, outside the Loan, for the implementation and completion of the HWM component. Bank's assistance would consist of review of the bidding documents and assistance for the identification/selection of an operator for the Hazardous Waste Management Facility to be located near Tebessa, in the eastern part of the country. The bidding documents for goods and works should be issued by the end of 2005 and construction will then be financed through already allocated funds from GOA's budget.

### ***Component B: Environmental Investment Component***

**The outcome related to this component is rated satisfactory** despite the cancellation of portion of the loan initially allocated to the implementation of this component and considering the actualization of the commitment of the two concerned companies to proceed towards reaching the original project objectives. The following results show that the environmental impacts have been substantial as also demonstrated through the cost-benefit analysis presented in annex 3 of this ICR.

#### **ASMIDAL – FERTIAL** (see table 2 annex 3 for project performance indicators):

ASMIDAL's project activities were put in motion based on technical and environmental audits that had been previously carried out. Activity at the sulfuric acid plant had ended in December 1995, its decommissioning took place in February 1997, and 9000 t/year of SO<sub>x</sub> emissions was eliminated. The phosphoric acid unit had been closed in December 1995 and 300,000 t/year of phosphogypsum waste were removed permanently. Other key project activities included: (i) the rehabilitation of the fertilizer plant, which consisted in the installation of dust recovery system; (ii) the installation of an ammonia catalytic reduction system; (iii) the installation of a liquid fertilizer production plant whose operations have resulted in a significant nitrate dust reduction. The Project completion has also resulted in the improvement of air quality in the area where the industrial complex is located and helped foster better public relations for ASMIDAL. Total Project costs were US\$20.75 million financed both by the project and by ASMIDAL (see table 2 in annex 2).

#### **ENSIDER** (see table 3 annex 3 for project performance indicators)

ENSIDER's project activities were able to reduce industrial pollution through the following investments: (i) installation of dust removal systems for the electric and blast Furnaces and Sintering Plants and installation of a door Cleaning System in the coke ovens; (ii) installation of an ammonia distillation and incineration System; (iii) installation of WWTP at the rolling-mill sites; and (iv) implementation of solid waste reduction and recycling processes. In addition, implementation of a targeted environmental management measures were carried out in parallel. Through the implementation of its environmental management strategy, ENSIDER has been able to improve the quality of its air and liquid emissions and optimize its energy use through the recycling of cooling water in various units. In addition, ENSIDER achieved a 13% reduction on its energy consumption for the period 2001-2004 and saving 53% on its water use in 2004. The impact of the project has been positive for the environment as well as for ENSIDER's operations.

#### *4.3 Net Present Value/Economic rate of return:*

Using a dose-response model, a cost-benefit evaluation of the project's investments is included in Annex 3 (table 1). The analysis provides an evaluation of the benefits occurring in terms of: (i) direct public health impacts on mortality and on morbidity which takes into account such cases as hospital admissions for respiratory illnesses, emergency room visits, asthma attacks, other respiratory symptoms, chronic bronchitis and children respiratory illnesses; (ii) indirect impact on limited activity which includes number of activity days; (iii) fertilizer dust recycling by ASMIDAL from increased efficiency of the dust removal equipment; (iv) impacts on the local fishing industry measured in terms of increases in the fish catch in the bay of Annaba; and (v) impact on real estate values. Impacts on air quality and respiratory morbidity are shown in tables 1-4 in annex 3.

An interesting characteristic of this project is that the benefits started to accrue when companies, and in particular the company ASMIDAL, started to take measures such as the decommissioning of the Sulfuric Acid and Phosphoric acid plants in 1995, in agreement with their commitments to the objectives of the project. This point underscores the importance and efficiency of measures based on rigorous and inclusive economic analysis that led to a beneficial solution both from the environmental and financial point of views.

Finally the analysis shows that during the period covered by the analysis, for each dollar invested in the project by all stakeholders, nearly US\$6.00 (benefit to cost ratio) were generated as direct benefits or as avoided costs. This corresponds to a net present value of US\$294 million and US\$43 million (at 6% discount rate- this relatively low discount rate to reflect the important public good and environmental dimension of these costs and benefits), respectively for the total indirect and direct benefits and in the case where only the health benefits are taken into consideration. At 10% discount rate these figures are, respectively, US\$246 million and US\$31 million.

#### *4.4 Financial rate of return:*

As an environmental project, a financial rate of return was not calculated in the SAR and therefore is not included in the ICR. Although it has not been calculated explicitly, the project has demonstrated in the case of the two target companies, and especially ASMIDAL, that sound environmental objectives could be consistent and actually reinforce the development strategy of the company.

#### *4.5 Institutional development impact:*

**This outcome is rated substantial:** The Ministry of Land Use Planning and Environment - MLUPE) was the main beneficiary of the institutional strengthening component of the project. The project allowed MLUPE to strengthen its operational capacity in key areas:

- On the regulatory side, the project generated important guidance on the draft EIA decree that will be approved by the government in 2005-2006. Approval and implementation of this decree will provide a major alignment with the new environmental protection law enacted in 2003. In addition, the MLUPE has taken steps to extend the air quality monitoring networks to two other major cities of Skikda and Oran considering the success of the networks installed in Algiers and Annaba. The monitoring networks of Skikda and Oran will be financed by the budget of MLUPE. Furthermore legal provisions have been included in the 2005 budget law and have been prepared to be submitted to the government. These proposed changes will allow the proper use of the environment and pollution abatement fund (FEDEP) as a financial intermediary that will be able to provide financial incentives for industrial pollution abatement activities. The MLUPE has built confidence through the IPC project and is now developing a similar industrial pollution abatement project in Ghazaouet in the western part of the country.

- At the local level, the environment inspectorates have been strengthened and able to play a significant role in the local development policy.
- A training program has been implemented and completed as part of the Technical Assistance component of the project and has helped to improve the expertise of professionals dealing with environmental management and natural resources protection.

## 5. Major Factors Affecting Implementation and Outcome

### *5.1 Factors outside the control of government or implementing agency:*

During the 1990's decade, Algeria had been experiencing a period of political instability that affected the institutional sphere and, in consequence, impacted negatively the implementation of most Bank-financed project. Governmental policies were short-lived because of political changes and only in 2001 the first signs of recovery and stability started to appear.

### *5.2 Factors generally subject to government control:*

It is considered that because of the factors mentioned in the previous paragraph, the government did not provide adequate project ownership during the first half of the project implementation period. Project implementation suffered greatly from the successive institutional changes that occurred in the sector. These changes undermined the work of the project implementation unit, which itself was subject to several changes. This resulted in delays in procurement for the three components and caused disbursements to lag behind the initial schedule. In addition, ENSIDER, a public enterprise at the time of project effectiveness, delayed implementation of all projects activities due to financial difficulties.

### *5.3 Factors generally subject to implementing agency control:*

The Borrower had great difficulty in adhering to Bank procurement procedures. This resulted in lengthy approval procedures within the national public procurement system and consequently slowed the implementation of contracts for the pilot investment projects as well as for the institutional strengthening component. However, the main cause for this situation is more systemic to Algeria rather than specific to the particular implementing agencies involved in the project.

### *5.4 Costs and financing:*

The second loan amendment led to the cancellation of US\$41.4 millions from the loan leaving US\$11.6 million for ASMIDAL, US\$4.0 million for ENSIDER (corresponding in the case of these two companies to disbursements already made or to payments committed) and US\$21.0 million for the institutional and legal component of MLUPE (US\$10.5 for the original institutional strengthening component and US\$10.5 million for the new Hazardous Waste Treatment Plant component). The cancellation of a major share of the loan did not affect significantly the implementation of the physical component of the project as the companies decided to finance the remaining activities using their own resources. The project amount actually totaled US\$36.4 million of which US\$23.4 million were effectively disbursed which is 64% of the amended amount or 30% of the initial amount (see tables 1-2 in annex 2).

## 6. Sustainability

### *6.1 Rationale for sustainability rating:*

**This ICR rates the sustainability of the project as likely.** The policy framework and components put in place by the project and current GOA initiatives will ensure the sustainability of project outputs in the area of industrial pollution control and Environmental Policy Management. The project has strengthened the institutional and legal capacity within the environmental management framework. Key to the sustainability

aspect are the environmental management performance agreements, which have resulted in strengthening compliance with environmental regulations in other sub-sectors of industry as industrial enterprises operators and investors are including environmental management into their activities as well as a significant improvement in monitoring and enforcement capabilities. The key accomplishments in this regard are: (i) a strengthened environmental regulatory framework; (ii) the development by the Government of a coherent environmental and sustainable development policy as well as a vital environmental program resulting from the preparation of a *Sustainable Development and National Environment Action Plan*; (iii) the establishment of a National Environmental Fund, this fund was expanded to include the possibility of financing pollution abatement investments; (iv) the implementation of a critical training program that should continue to strengthen and expand human resources capabilities in the areas of environmental management; (v) the creation of a national environmental knowledge base that should provide a significant analytical framework for local professionals working in the areas of environmental management, solid, and hazardous waste disposal, environmental economics, and clean technologies; and (vi) the establishment of monitoring capabilities at different level of the environmental administration and in particular the establishment of air quality monitoring networks and environmental laboratories.

#### *6.2 Transition arrangement to regular operations:*

Most of the investment projects leading to pollution abatement have been completed and commissioned by ENSIDER and ASMIDAL. These two companies have internalized good management practice, established environmental units and signed with the ministry of environment voluntary environmental performance agreements. These steps certainly helped the two companies negotiate successfully their privatization process, by increasing their goodwill and decreasing the perceived risk of environmental liabilities due to past pollution. It is also important to underscore that following the implementation of this project, the companies adopted a more open communication policy towards the public and even organized *open-doorevents*.

## **7. Bank and Borrower Performance**

### **Bank**

#### *7.1 Lending:*

**Project preparation and appraisal are assessed as satisfactory.** Formal appraisal took place in May 1995 and the Bank did allocate adequate resources for project preparation and for its assistance to the Borrower in undertaking studies needed for the project. The overall risks of the projects were considered high at the time of project preparation but the investment component of the project and later the hazardous waste component were viewed as high risk but high rewards activities.

#### *7.2 Supervision:*

**Project supervision is assessed as satisfactory** The project was supervised in a complex country environment characterized by institutional instability and security problems. However, despite frequent changes in the counterpart decision makers during the initial stages of the project, the Bank team carried its supervision of the project with commitment and was able to sustain continued sector dialogue that enabled project revision in May of 2002. Continuity of supervision quality was ensured as Bank staff showed flexibility and understanding in responding to evolving circumstances. Considerable supervision efforts were given to the implementation of the hazardous waste management component as progress was slow and implementation issues of the component required thorough attention to technical details. Overall, Bank teams were well staffed with a good skill mix. Management and staff maintained strong continuity in the dialogue with the counterpart. The PIU and the Bank team worked in tandem to ensure that progress in implementation was achieved. Concrete progress had been made by July 2004 contributing to the establishment of a stronger institutional and legal framework for environmental management. *A QAG/QSA review in October 2004 reached a similar conclusion regarding the supervision performance of the*



project.

### *7.3 Overall Bank performance:*

Taking into account all of the above; **the Bank's overall performance is assessed to have been satisfactory.**

### *Borrower*

#### *7.4 Preparation:*

**Satisfactory.** Project objectives reflected GOA's commitment in strengthening its institutional capacity. Sector's institutions were genuinely interested in developing a productive dialogue with the Bank. The government committed to take unpopular actions in the case of the company ASMIDAL as required by the project. Two of the plants constituting the fertilizer complex of ASMIDAL in Annaba were closed. One was dismantled and the other retrofitted for the production of less polluting compound.

#### *7.5 Government implementation performance:*

**Satisfactory.** As mentioned earlier, the political volatility that plagued the country during the 1990's led to institutional instability that was detrimental to the project during the early years of the project. However, by 2001, the Ministry of Land Use Planning and Environment was established and played an effective role in revitalizing the project. The Ministry of Finance played also a catalytic role in ensuring that the most pressing issues were dealt with diligently but the inability to support the implementing agencies in applying the fiduciary requirements of the World Bank remained an impediment during the life of the project. The adoption by the government of several measures and regulations resulting directly from the project activity was a strong sign of government commitment and should be appreciated as such.

#### *7.6 Implementing Agency:*

**Satisfactory.** Despite project implementation delays due to an array of different causes outside its direct control, the implementation agencies (ASMIDAL, SIDER and MLUPE/DGE) performed adequately. For instance, by mid-term review, stability in the main implementation entity (MLUPE/DGE) counterpart team was regained and allowed an improvement in implementation performance. However, difficulty to understand World Bank procurement process remained a significant hurdle.

#### *7.7 Overall Borrower performance:*

Taking into account all of the above, **the Borrower's overall performance is assessed to have been satisfactory.**

## **8. Lessons Learned**

### *8.1 General lessons from project design and implementation in the particular area of industrial pollution control*

**Implementation of the hazardous waste component:** The project was right in adopting a careful approach in the implementation of the hazardous waste treatment facility in properly requesting an EIA as soon as it appeared that the original site considered during project preparation was no longer available. Then feasibility studies and market assessments were necessary to assess the financial viability of the project as well as the attractiveness of the project to the private sector. The lesson learned is that the quality of preparation has here led the client to continue the project using its own resources thus ensuring the sustainability of the action started under the project.

**Project ownership by the Borrower:** Numerous institutional and administrative changes undermined responsibility and accountability for project implementation. Weak project ownership



affected project implementation from 1997 to 2001 in terms of commitment to disbursement, compliance with the procurement schedule, and adherence to loan covenants. However, consistency in the dialogue finally bore fruits after institutional stability was regained in 2001/2002.

### **8.2 Specific lessons for future projects in Algeria in the environmental area**

**Industry's attitude towards environmental management policy:** Project's implementation has resulted in shaping industry responses to environmental policy incentives and stronger enforcement. This is illustrated by the signing of more than 25 voluntary environmental performance agreements by other industrial operators. Furthermore, it shows that industry is willing to be more proactive in dealing with pollution abatement.

**Environmental Pollution Abatement Fund (FEDEP):** This fund requires further improvements in terms of its governance, financial capacity, financing mechanism and environmental cleanup strategy. However, it has the potential of being a cornerstone for the sustainable financing of environmental investments, provided further attention is paid to overcoming regulatory and institutional barriers preventing its upgrading. FEDEP's main role focuses on two areas of environmental management: one is related to the issue of the environmental liability for past pollution and the other is related to the promotion of cleaner technologies.

**ASMIDAL and ENSIDER Pilot Projects:** These two projects proved to be catalysts for the project impacts as they resulted in concrete reduction in industrial pollution and proved to be encouraging test cases for the implementation of environmental management tools such as the environment performances agreements and integrated pollution control approaches. They provide a learning experience that should be used as reference for future projects.

## **9. Partner Comments**

*(a) Borrower/implementing agency:*

(a) Borrower/ implementing agency:

The borrower, represented by the Ministry of Land Use Planning and Environment, has reviewed the Bank's ICR and found it appropriate. This feedback was provided by email on December 24, 2005.

The borrower has prepared its completion report, a summary of which is appended in Annex 8 of this ICR.

*(b) Cofinanciers:*

*(c) Other partners (NGOs/private sector):*

## **10. Additional Information**

## Annex 1. Key Performance Indicators/Log Frame Matrix

Key Performance Indicators	Baseline	MTR		End of Project	
Outcome/Impact Indicator		Target	Actual	Target	Actual
1-Increase in environmentally related investment included as priorities in the NEAP in US\$ million	78.0	132.0	132.0	200.0	200.0
2- Increase in the number of environment professionals in sector ministries and local agencies	115	215	225	280	315
3- Number of participants in training programs	0	225	250	560	363
4- Number of completed studies	0	3	2	4	4
5- Number of legal regulations enacted	n.a		2*		4
6- Release of dusts to air (t/y)	40,000	10,000	n.a	11,000	n.a
7- Reduction of SO <sub>2</sub> to air (t/y)	16,400	7,000	n.a	n.a	8,000
8- Reduction of Phosphogypsum to water (t/y)	288,000	0	0	0	0
9- Reduced perceived respiratory morbidity in downtown Annaba	42.3%				32%
10- Reduced in Asthma prevalence	7.8%				1.3%
- El Bouni	6.3%				1.4%
- Sidi Amar					
10- Reduced emissions of SO <sub>x</sub> from the ASMIDAL fertilizer Complex.	3096 t/y		0.0 t/y		0.0 t/y
11. Reduced dust emissions from the ASMIDAL fertilizer Complex.	5405		300		300

\* 2 laws enacted (updated environmental protection law and solid waste law)  
 2 decrees pending (EIA and hazardous and dangerous establishments)

**Table 2 : Pilot Industrial Pollution Abatements Projects: ASMIDAL-FERTIAL – Components Outputs**

ASMIDAL-FERTIAL Project Activities	Outputs
<b>Implementation of Environmental Management Performance Contract</b>	An Environmental Management Unit was put in place Installation of a monitoring system/detecting unit that analyze gaseous emissions & dusts of smokestacks of the facilities at the plant All air emissions and wastewater are under control and are well below accepted norms Installation of equipments for optimal NOx and Fluoride uses/dosage Other emissions: Wastewater- PH:6.0 - 8.5; Suspended Solids are at less than 30 mg/L; Oxygen load requirement is at less 120 mg/L; Fluorine is at less than 20 mg/L; Nitrogen (ammonia) is at less 10 mg/L
<b>Nitric Acid Plant</b>	Rehabilitation of equipments for the reduction of residual gases Installation of Equipments for ammonium catalytic reduction NOx emissions are below 300mg/Nm3; Dust emissions are at less than 50 mg/Nm3 or less than 100 ppm. Implementation of s system for equipments' preventive maintenance
<b>NPK Plant</b>	Installation and effective operation of a dedusting system for two production lines at the fertilizer plant Implementation of s system for equipment preventive maintenance
<b>Ammonium Nitrate Plant</b>	Installation of a new production line, including a new process (UAN) that allows the production of dust-free liquid fertilizers. The change in the production process, including a catalyst resulted in the reduction of NOx emissions to less than 150ppm. Ammonia emissions are at less than 50 mg/Nm3, Fluorine emissions are at less than 5 mg/Nm3
<b>Sulfuric Acid Plant</b>	Evaluation/Assessment of the operation to decontaminate the area in which is located the sulfuric acid plant ASMIDAL-FERTIAL is in the process of mobilizing financing to implement the decontamination operation.
<b>Solid Waste Management</b>	Implementation of solid waste reduction and recycling processes The installation of a new dedusting system resulted in the reduction of solid waste accumulation. <u>Hazardous Waste Management:</u> All PCB based electrical transformers have been inventoried and stocked Other hazardous waste are disposed of and stocked according to new environmental norms Other recyclable solid waste, including sale to recycling companies, is subject to well and environmentally accepted procedures. Income from sale of recyclable waste is being used for the purposes of environmental management.
<b>Training and Awareness Campaign</b>	ASMIDAL-FERTIAL continues to provide HR training in the following areas: Monitoring and control of air emissions and used water discharges; Hazardous waste Management; and Environmental management systems

**Table 3: Pilot Industrial Pollution Abatements Projects: ENSIDER-ISAPT – Components Outputs**

ENSIDER-ISPAT Project Activities	Outputs
<b>Implementation of Environmental Management Performance Contract</b>	Implementation of an Environmental Management Action Plan (EMAP) aimed at reducing pollution Designation of monitors to follow up on the implementation of EMAP at the production plants Implementation of Awareness Campaigns targeted at the production plants A monitoring and control team is in place since 1998. A Environmental Management Department, comprised of 3 engineers, is also in place.
<b>Installation of Dust Removal Systems for the Electric and Blast Furnaces and Sintering Plants and Installation of Door Cleaning System in the Coke Ovens</b>	(1) Blast Furnace # 2: Implementation of Preventive Maintenance for the Dust Removal System (at the loading zone) and implementation of operating procedures; (2) Steel Works-ACO2: 90% of air emissions are under control and implementation of additional control measures; (3) Steel Works-ACO1: Dust Removal system at the pig-iron loading and converter system has been operational since 1994 and rehabilitation of Dust Removal System at the pig-iron unloading zone; testing in progress (3) Coke Ovens: assembly and installation of 80% of doors (door cleaning system) Dust content is at less than 50mg/Nm3 (blast furnace & Steelworks), Particulate load is less than 50mg/Nm3 and 0.15 Kg/ton of coke output. Duration of visible smoke emissions is less than 55 cumulative seconds per consecutive loads (coke oven)
<b>Installation of Ammonia Distillation and Incineration System</b>	(1) Draining and cleanup of site basins / civil works control procedure: completion of assembly and system testing; launching of activities related to ammonia distillation and incineration of ammonia er Nitrogen Oxide is less than 6Kg/ton of coke output; Ammonia is less than 50mg/Nm3 (nitrogen); Benzene is less than 0.1 Kg/ton of coke output & 5mg/Nm3. Organic Compounds are less 0.3 kg/ton of coke output & 20 mg/Nm3.
<b>Installation of WWTP at the Rolling-Mill Sites</b>	(1) Hot Rolling-Mill (LAC): Rehabilitation of silting basin filter including rehabilitation of civil works. In addition, construction and assembly of all components: Delivery of Oil Removal system for circuit II & III and installation is in progress; (2) Cold Rolling-Mill (LAF): Rehabilitation of Oil treatment Unit - System testing ongoing. Suspended Solids are less than 30mg/L; Oils are less 20 mg/L; Iron load is less 5 mg/L; PH is at 5.5 - 8.5
<b>Solid Waste Management</b>	Implementation of solid waste reduction and recycling processes; 24.79 Kg/tonne of by-products are being recycled within the plant; these include laminar rust, steelworks sludge, gas dusts and coking smalls. Preparation and launching of a Steelwork Slags treatment project Implementation of an awareness campaign on the importance/usefulness of solid waste screening Incinerator Rehabilitation Project: Rehabilitation work has been completed, testing is in progress and training has been provided. Implementation of PCB-based waste legislation Disposal/destocking of hazardous waste from LAF and LAC

**Table 4: Industrial Pollution Control Project -Training of Environmental Management Professionals**

<b>Specialization</b>	<b>Number of Staff Trained</b>
Air Emissions Control Operation and Maintenance of Pollution Control Facilities	47
Management of Industrial Solid Waste	52
Management of Hospital and health care Waste	35
Environmental Impact Assessments	34
Environmental Management for Business and Private Sector	27
Environmental Taxation Implementation Measures for Taxation	30
Environmental Audits	26
Recycling of Industrial Solid Waste	40
Control and Monitoring of Industrial Wastewater Operation and Maintenance of WWTP	16
Awareness Campaigns for Air Quality Monitoring and Industrial Pollution Abatement	22
Management, Operation and Maintenance of Air Quality Monitoring Networks	17
Upgrading Standards and Strengthening of Environmental Regulation	17
<b>Total of Staff Trained</b>	<b>363</b>

## Annex 2. Project Costs and Financing

**Table 1: Estimated Cost as per SAR (in US\$ Million - 1995)**

Components	Total	Foreign	Local	IBRD	Govt.
<b>A: Strengthening the Institutional and Legal Framework</b>					
1- Institutional strengthening	10.50	8.41	2.09	8.74	1.76
2- Legal strengthening	0.35	0.24	0.11	0.35	0.00
3- Monitoring & Enforcement	0.81	0.65	0.16	0.81	0.00
4- National Environment Fund	0.60	0.33	0.27	0.60	0.00
<b>Sub-Total A</b>	<b>12.26</b>	<b>9.63</b>	<b>2.63</b>	<b>10.50</b>	<b>1.76</b>
<b>B: Pilot Investments</b>					
1- ASMIDAL	59.08	52.34	6.74	35.00	24.08
2- ENSIDER	46.76	33.31	13.45	32.50	14.26
<b>Sub-Total B</b>	<b>105.84</b>	<b>85.65</b>	<b>20.19</b>	<b>67.50</b>	<b>38.34</b>
<b>Total Project Costs</b>	<b>118.10</b>	<b>95.28</b>	<b>22.82</b>	<b>78.00</b>	<b>40.04(*)</b>

(\*) US\$0.06 million discrepancy due to rounding

**Table 2: Actual Project Costs (in current US\$ Million)**

Components	Bank financed	Country financed	Total
<b>A1: Strengthening the Institutional and Legal Framework</b>	8.94	--(*)	---
<b>A2: Hazardous Waste Management Facility</b>			
Goods	3.82+0.44		
Works	0		
TA	4.47+0.21		
<b>B: Pilot Investments</b>			
1- ASMIDAL	11.24	9.50	20.75
Goods	9.68+0.30		
TA	1.26		
2- ENSIDER	3.32	3.50	6.72
Goods	1.56+0.1		
TA	1.54+0.12		
<b>Total Project Costs</b>	<b>22.34</b>	<b>13.0</b>	<b>---</b>

### Annex 3. Economic Costs and Benefits

**Table 1: Costs and Benefits Analysis (in US\$ million)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<b><u>Benefits</u></b>																			
<b>public health benefits</b>																			
direct	1.41	2.66	3.75	4.76	5.10	5.55	6.62	7.47	7.97	8.22	8.48	8.74	9.02	9.29	9.58	9.87	10.1	10.4	10.79
indirect	0.22	0.49	0.76	1.01	1.27	1.73	2.09	2.47	2.62	2.73	2.84	2.96	3.09	3.22	3.35	3.49	3.63	3.78	3.94
<b>private benefits</b>																			
Benefits accrued to ASMDAL (saved fertilizer)	0	0	0	0	0	0	0	0	7.94	8.16	8.37	8.58	8.80	9.01	9.22	9.43	9.65	9.86	10.07
Benefits accrued to groups (fishermen)	0	0	0	1.74	1.79	1.80	1.87	1.92	1.97	2.03	2.08	2.13	2.19	2.24	2.29	2.35	2.40	2.45	2.50
Benefits to real estate owners	50.9	39.9	33.6	28.7	21.4	15.3	11.4	7.25	3.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Benefits</b>	<b>52.5</b>	<b>43.1</b>	<b>38.1</b>	<b>36.2</b>	<b>29.5</b>	<b>24.4</b>	<b>21.9</b>	<b>19.1</b>	<b>24.2</b>	<b>21.1</b>	<b>21.7</b>	<b>22.4</b>	<b>23.0</b>	<b>23.7</b>	<b>24.4</b>	<b>25.1</b>	<b>25.8</b>	<b>26.5</b>	<b>27.31</b>
Discounted total benefits	52.5	40.6	33.9	30.4	23.4	18.2	15.4	12.7	15.2	12.5	12.1	11.8	11.4	11.1	10.8	10.4	10.1	9.87	9.57
Discounted public health benefits	1.62	2.97	4.01	4.84	5.05	5.44	6.14	6.61	6.65	6.48	6.32	6.17	6.02	5.87	5.72	5.57	5.43	5.30	5.16
Cumulative Discounted total benefits	52.5	93.2	127	157	181	199	214	227	242	255	267	279	290	301	312	323	333	343	352
Cumulative Discounted public health benefits	1.62	4.59	8.60	13.4	18.4	23.9	30.0	36.6	43.3	49.8	56.1	62.3	68.3	74.1	79.9	85.4	90.9	96.2	101.3
<b><u>Costs</u></b>																			
Cost of the project (WorldBank financed)	0.00	0.00	0.00	0.60	2.74	4.85	4.08	4.70	5.49	2.59	5.07	0.94	0.79	0.63	0.47	0.32	0.16	0.01	0.00
Cost to MATE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Cost to ASMDAL	0.00	0.00	0.00	0.05	0.10	0.20	0.30	10.00	10.00	5.00	3.00	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Cost to SIDER	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	4.00	4.00	4.00	4.00	4.00	1.13	1.13	1.13
<b>Total Costs</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.65</b>	<b>2.84</b>	<b>5.10</b>	<b>4.43</b>	<b>14.8</b>	<b>15.6</b>	<b>7.74</b>	<b>8.22</b>	<b>7.16</b>	<b>7.00</b>	<b>6.85</b>	<b>6.69</b>	<b>6.54</b>	<b>3.51</b>	<b>3.35</b>	<b>3.34</b>
Discounted total costs	0.00	0.00	0.00	0.54	2.25	3.81	3.12	9.87	9.81	4.58	4.59	3.77	3.48	3.21	2.96	2.73	1.38	1.24	1.17
Cumulative Discounted total costs	0.00	0.00	0.00	0.54	2.80	6.61	9.73	19.6	29.4	33.9	38.5	42.3	45.8	49.0	52.0	54.7	56.1	57.3	58.53
<b>Total Net Benefit</b>	<b>52.5</b>	<b>43.1</b>	<b>38.1</b>	<b>35.6</b>	<b>26.7</b>	<b>19.3</b>	<b>17.5</b>	<b>4.26</b>	<b>8.64</b>	<b>13.4</b>	<b>13.5</b>	<b>15.2</b>	<b>16.0</b>	<b>16.9</b>	<b>17.7</b>	<b>18.6</b>	<b>22.3</b>	<b>23.2</b>	<b>23.97</b>
Discounted Total Net Benefit	52.5	40.6	33.9	29.8	21.1	14.4	12.3	2.84	5.42	7.93	7.57	8.04	7.99	7.93	7.85	7.76	8.80	8.62	8.40
Cumulative Discounted Net Benefit	52.5	93.2	127	157	178	192	205	207	213	221	228	236	244	252	260	268	277	285	294

**Table 2: Costs and Benefits Analysis (continued)**

Discount rate:	6.00%	10.00%	15.00%
Present value of total benefits	353	287	235
Present value of public health benefits	101	72	50
Present value of costs	59	42	28
Discounted Net Benefit	294	246	207
Discounted Net Benefit (counting only Public Health benefit)	43	31	22
Benefit to Cost Ratio	6.0	6.9	8.4
Benefit to cost Ratio (counting only public health benefits)	1.7	1.7	1.8

**Table 3: Air Quality Indicators (1994 and 2002)**

	Air Pollution 1994			Air Pollution 2002		
	PM10	SO2	NOx	PM10	SO2	NOx
Downtown Annaba	84.7	144	1197	60 (-29.2%)		
El Bouni	173.3	321	3320	77 (-55.6%)	37 (-88.5%)	57 (-98.3%)
Sidi Amar	71.5	130	---	70 (-2.1%)	66 (-49.2%)	66

**Table 4: Impacts on Respiratory Morbidity**

	Respiratory morbidity 1993		Respiratory morbidity 2000	
	Respiratory illness	Asthma	Respiratory illness	Asthma
National Average	36	0.8	--	--
Wilaya of Annaba	--	1.7	--	--
Downtown Annaba	42.5	3.8	32 (-24.7%)	2.06 (-45.8%)
El Bouni	--	7.8	22	1.3 (-83.3%)
Sidi Amar	--	6.3	--	1.4 (-77.8%)



## Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
			Implementation Progress	Development Objective
Month/Year	Count	Specialty		
<b>Appraisal/Negotiation</b> May 1995	5	Mission Leader (1); Senior Environmental Spec (1); Environmental Economist (1); Environmental Specialist (1); Financial Specialist		
<b>Supervision</b> 07/03/1997	3	Mission Leader Environmental Economist (1) Financial Specialist	S	HS
04/08/1998	3	Mission Leader Environmental Economist (1) Financial Specialist	S	S
11/28/1998	3	Mission Leader Environmental Economist (1) Procurement Specialist	U	S
06/16/1999	4	Mission Leader Environmental Economist (1) Procurement Specialist Financial Specialist	U	S
10/10/2000	5	Mission Leader- Environmental Specialist (1) Environmental Economist (1) Fertilizer Industry Consultant (1) Steel Industry Consultant (1)	U	S
12/15/2000	1	Mission Leader- Regional Environment Coordinator(1)	U	S
05/20/2001	2	Mission Leader-Lead Environmental Specialist (1) Sector Manager-MNSRE	U	S
10/20/2001 MTR	6	Mission Leader- Environmental Specialist (1) Environmental Economist (1) Procurement Specialist (1) Fertilizers Industry Spec (1) Steel Industry Spec (1)	U	S
05/14/2002	1	Mission Leader – Senior Environmental Specialist (1)	S	S
12/02/2002	4	Mission leader – Senior Environmental Specialist (1) Regional Env Coordinator (1) Procurement Analyst (1)	S	S

<b>ICR</b>	05/03/2003	5	Mission leader – Senior Environmental Specialist (1) Regional Environmental Coordinator (1) Senior Procurement Spec (1) Cons. in Solid Waste Mgmt (2)	S	S
	10/30/2003	2	Environmental Specialist (1) Regional Environmental Coordinator (1)	S	S
	06/22/2004	3	Mission leader – Senior Environmental Specialist (1) Regional Env Coordinator (1)	S	S
	11/30/2004	3	Mission leader – Senior Environmental Specialist (1) Regional Environmental Coordinator (1) Procurement Analyst	S	S
	06/06/2005	3	Mission leader – Senior Environmental Specialist (1) Regional Environmental Coordinator (1) Consultant-Economist (1)	S	S

Source: SAP (October 2005)

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Appraisal/Negotiation	--	--
Supervision	93	694,617.62
ICR	6	25,000.00
Total	99	719,617.62

## Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
 <i>Social</i>					
<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |                                      |                          |                                    |                         |                          |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

### 6.2 Borrower performance

#### Rating

- |  |                          |                                    |                         |                          |
|--|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Preparation                           | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall                               | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

## **Annex 7. List of Supporting Documents**

- Mission aide-memoires
- PSR/ISRs
- Cost-Benefit assessment

## **Additional Annex 8. Borrower's Project Completion Report**

### **RÉSUMÉ DE LA CONTRIBUTION DE L'EMPRUNTEUR AU RAPPORT D'ACHÈVEMENT (PRÊT 4034-AL) PROJET DE CONTRÔLE DE LA POLLUTION INDUSTRIELLE**

#### **SYNTHESE**

**Le projet « Contrôle de la Pollution Industrielle » -CPI- très générique dans sa conception de base et après adaptation aux besoins réels, a su répondre dans les délais impartis à l'objectif ambitieux fixé au départ ; parfois même, il est allé au-delà des programmes prévisionnels pour pouvoir répondre à des besoins et des attentes non programmés mais dont la réalisation était indispensable à la poursuite du projet.**

Il est caractérisé par 5 blocs composés chacun de différents activités.

Suite à l'identification et à l'évaluation des besoins nécessaires pour la mise à niveau professionnelle et institutionnelle de la gestion des déchets spéciaux et de la protection de l'environnement, le projet a procédé à des actions prioritaires par le renforcement des capacités institutionnelles, administratives et juridiques de l'administration et des acteurs dans le domaine de l'environnement ainsi que par des actions d'anticipation et de précaution environnementale comme les pré diagnostics environnementaux et **l'introduction, de la dimension économique dans les analyses environnementales.**

Dans le cadre de la mise en place d'instruments institutionnels de gestion écologique, le projet a assuré la formation environnementale dans les domaines des déchets industriels, de l'eau, de l'air, de l'assainissement et des pollutions à l'intention notamment des cadres du Ministère et de ses partenaires ainsi que des entreprises. Ces actions ont pu être réalisées grâce à la **mise en place du Centre National des Formations à l'Environnement (CNFE).**

En favorisant la création du CNFE, le projet CPI, a su réaliser un cadre et des conditions de travail optimal pour une formation adéquate dans tous les domaines de l'environnement. Grâce à son statut « commercial », le CNFE peut garantir une formation adéquate et pérenne à tous les secteurs concernés et intéressés par l'amélioration des ressources humaines en savoir-faire environnemental. La structure peut aussi assurer un suivi pédagogique des stagiaires pour accroître l'efficacité des formations dispensées. Un travail de marketing continu est indéniable

Le Ministère de l'Aménagement du Territoire et de l'Environnement, par le biais du Conservatoire National de Formation à l'Environnement devrait orienter sa stratégie de formation en collaboration avec les ministères chargés de l'éducation et de la formation professionnelle vers des formations diplômantes, formations qualifiantes et formations de formateur. Cette démarche constitue la base pour l'identification des profils et types de métiers de l'environnement, la mise en

place de formations et le déploiement progressif des métiers de l'environnement en Algérie.

Par ailleurs, le projet a efficacement contribué à la mise en place d'un système d'information par la mise oeuvre d'un système d'information au niveau de la DPEI relié à toutes les Directions de l'environnement au niveau national. Cet acquit donne une assise très solide pour élargir dans les meilleures conditions ce système.

Un système National de l'Information Environnementale (SNIE) est une nécessité étant donné que l'ONEDD est une organisation où l'information est capitale. L'efficacité de l'ONEDD dépendra donc directement de l'efficacité de son « Système d'Information » ; la mise en place d'un tel système **au niveau national** est un objectif ambitieux qui requiert des ressources humaines compétentes ainsi que des moyens matériels et financiers mais et surtout au vu de la situation dans ce domaine en Algérie une mise en place d'un SNIE efficace et fiable exige du temps.

En ce qui concerne la mise en oeuvre d'une gestion intégrée pour la réduction de la pollution, l'ONEDD, avec l'assistance d'une expertise externe, pourrait donner suite aux travaux préparatifs effectués dans le cadre du projet et procéder immédiatement à son application par un test auprès des structures industrielles pilotes FERTIAL et ISPAT déjà sensibilisées par le projet pour une telle action.

Ainsi le CPI a contribué à l'installation des structures appelées à suivre à l'avenir, d'une part, les instruments de surveillance comme l'auto-contrôle des rejets et l'auto-surveillance des installations de dépollution et, d'autre part, les instruments techniques de gestion écologiques comme les CET et l'introduction des technologies plus propres ces deux instruments institutionnels doivent dans l'avenir fournir les bases techniques d'une réglementation évolutive en harmonie avec le développement économique et social du pays..

Toutes les activités concernant l'élaboration d'une stratégie et de la mise en place du CNTPP ont été réussies. Le CNTPP a été créé et repose sur une base juridique et institutionnelle fiable et durable. Par ailleurs le projet a réalisé avec succès le premier cadastre des déchets spéciaux en Algérie lequel a permis de concrétiser un Plan National de Gestion des Déchets Spéciaux (PNAGDES) englobant une stratégie et un plan de mise en oeuvre des infrastructures et de la logistique nécessaires pour procéder à des actions de dépollution de grande envergure au niveau national.

Suite à cela un modèle de gestion intégrée pour la réduction de la pollution a été développé répondant aux besoins complexes d'un tel système. Ce modèle a été discuté avec les représentants de deux complexes industriels pilotes et a été amélioré en conséquence. La mise en oeuvre pratique d'un modèle de dépollution aussi complexe et qui touche à tous les niveaux –administratif, réglementaire et technique- de la concertation et de l'intégration des efforts de dépollution requiert un temps qui n'était plus disponible dans sa totalité pour le projet. Cependant les préparatifs d'une gestion intégrée sont de telle sorte réussies et les unités pilotes sont sensibilisées qu'il est possible au CNTPP de passer immédiatement au test pratique de ce modèle.

Finalement un modèle de gestion intégrée, prenant en considération les instruments et expertises réalisés dans le cadre du projet, a été élaboré. La demande d'autorisation d'exploitation, les instruments d'amélioration de la dépollution par le biais des Meilleures Techniques Disponibles (MTD) ainsi que l'utilisation d'un logiciel d'aide à la décision dans le but de la dépollution (DSS/IPC) sont les éléments clés de cette méthodologie.

Ces éléments du modèle ont été présentés et discutés avec les responsables de l'environnement des complexes industriels ISPAT et FERTIAL et pourraient être appliqués au niveau de ces deux structures industrielles lorsque des objectifs de qualité des milieux, réalistes, auront été cooptés avec l'accord des différents acteurs (collectivité, population et industriels) et les échéanciers ainsi que les mécanismes de financement de leur mise en œuvre auront été arrêtés.

Le projet a par ailleurs **contribué à l'élaboration des instruments économiques et financiers de gestion écologique comme le fonds pour l'environnement et la dépollution (FEDEP) et la fiscalité écologique. Le projet CPI a participé à l'instauration des contrats de performance environnementale** qui est une première démarche vers l'intégration du développement durable dans la politique des entreprises. Les entreprises signataires des contrats de performance s'engagent à financer les investissements nécessaires pour la dépollution et sont en contrepartie accompagnées par les services techniques du MATE et peuvent accéder au FEDEP pour des actions bien déterminées.

Le projet CPI a réalisé une étude sur la **responsabilité environnementale** et a préparé, dans le cadre de la fiscalité, une réglementation en vue de la prévention et de la prise en charge des dommages environnementaux.

L'étude a porté particulièrement sur les dispositions relatives à la répression administrative, sur les régimes de responsabilité civile et de responsabilité pénale, y compris les dispositions relatives à l'assurance ou d'autres garanties financières intervenant en matière de responsabilité environnementale.

La responsabilité environnementale en tant qu'instrument de politique de l'environnement réunit et conjugue deux moyens d'actions spécifiques : « (1) le transfert en amont de la responsabilité (matérielle et/ou économique ; totale ou partielle), de la collectivité vers les producteurs ; et (2) la création d'incitations en faveur de la prise en compte des aspects environnementaux par les producteurs dans le cadre de la conception des produits ».

L'étude recommande deux champs d'action prioritaires, à savoir l'adoption des textes d'application prévus par la loi et le renforcement des prérogatives et des moyens des Directions de l'environnement de wilaya pour la recherche et la constatation des infractions. Mener à bien les chantiers de réforme juridique dans ces domaines permettrait, avec un nombre limité de mesures, d'améliorer de façon significative l'efficacité pratique des dispositifs juridiques relatifs à la responsabilité environnementale.

La responsabilité élargie des producteurs est reliée à la fiscalité écologique, introduite par les



différentes lois de finances depuis 2002. Elle accompagne spécifiquement cette dernière au niveau de produits, de groupes de produits et/ou de flux particuliers de déchets

Le projet a, par ailleurs, participé à l'installation d'une fiscalité écologique pour l'Algérie et de ce fait à l'instauration des premières taxes écologiques. La fiscalité écologique a un impact de « réforme » budgétaire permettant de mieux répartir le poids de la dépense environnementale entre, d'une part, les contribuables et, d'autre part, ceux qui sont à l'origine d'une dégradation de l'environnement.

Les catégories suivantes de taxes concernant l'industrie ont été consolidées, élargies ou instituées à la faveur de la Loi de finances pour 2002:

*Taxe forfaitaire affectée :* Taxe sur les activités polluantes ou dangereuses pour l'environnement.

*Taxes écologiques d'orientation :* Taxe d'incitation au « destockage » des déchets industriels, taxe d'incitation sur les déchets liés aux activités de soins, taxe complémentaire sur la pollution atmosphérique d'origine industrielle.

Compte tenu des coûts des dommages portés à l'environnement (environ 6% du PIB sans l'environnement global) et des coûts de remédiation pressentis (quelque 3% du PIB), les actions de court et moyen terme, les investissements décennaux comme les mesures institutionnelles vont exercer un fort impact sur le budget de l'État. En particulier, les investissements vont non seulement tendre à alourdir la dépense publique de protection de l'environnement au démarrage des programmes, mais vont également impliquer des engagements pluriannuels pour la maintenance et le renouvellement des équipements.

Pourtant, ces augmentations de la dépense en faveur de l'environnement ne signifient pas que la dépense publique algérienne doive augmenter d'autant dans la mesure où c'est précisément le rôle de la fiscalité écologique que d'offrir un relais à la dépense publique en permettant de rapprocher la dépense de celui qui en est à l'origine, d'où le principe du pollueur – payeur.

Dans le cadre de la privatisation des entreprises, ni l'évaluation du coût de la pollution industrielle, ni celle des coûts de remédiation ne font partie de l'évaluation de leur actif net. L'évaluation financière de base d'une installation doit par conséquent être complétée d'une évaluation économique-écologique des coûts liés à une remédiation environnementale.

Il s'agit d'inscrire ce passif environnemental dans l'établissement de l'actif patrimonial net des entreprises industrielles concurrentielles de manière à consolider ce dernier au sens d'un actif qui soit épuré d'un point de vue à la fois financier, économique-social *et écologique*.

L'étude conduite par le projet a permis d'établir la procédure de prise en compte du passif environnemental des entreprises industrielles algérienne dans la procédure nationale de privatisation. Le processus de privatisation est tout d'abord présenté ensemble avec la question environnementale. Puis la procédure de saisie du passif environnemental d'une unité industrielle

ou d'un secteur est développée par étapes jusqu'à l'inscription d'une part environnementale dans l'affectation du produit de cession. La méthodologie permettant d'apprécier le passif environnemental à prendre en compte est connue du fait qu'elle a déjà été appliquée dans le secteur du ciment en Algérie.

Le « service » de ce type d'évaluation pourrait être confié au FEDEP au niveau de son comité des risques écologiques industriels

L'article 189 de la loi des finances pour 1992, modifié et complété par l'article 30 de la loi des finances complémentaire pour 2001 avait créé le compte d'affectation spéciale n° 302-065, intitulé « Fonds National pour l'Environnement et la Dépollution » (par abréviation FEDEP) pour développer des démarches permettant de soutenir les actions de dépollution et réduire les pressions exercées sur le milieu naturel.

L'objectif du Fonds consiste, à travers des mesures incitatives, à encourager les industriels à investir dans la dépollution. Le concours du Fonds est ouvert aux projets de dépollution sur la base de critères d'éligibilité clairement établis. Cette approche vise particulièrement à encourager l'acquisition de technologies de production plus propre.

La gestion technique des projets de dépollution et de protection de l'environnement a nécessité des réaménagements juridiques qui portent aussi bien sur des modifications de dispositions à caractère législatif ou réglementaire que sur la mise en place d'instrument adapté aux procédures de gestion technique et financière.

Dans ce contexte le projet a conduit une étude composée de deux volets essentiels :

**Le premier** a porté sur l'instrumentation juridique, notamment les dispositions législatives et réglementaires qui constituent des préalables pour la mise en œuvre du FEDEP et son fonctionnement efficient.

**Le second** volet a trait aux modalités techniques, aux procédures et aux tâches des différents partenaires qui interviennent, dans le cadre du fonctionnement du FEDEP.

**Par ailleurs des expertises ont permis de définir précisément les procédures pour la mise en œuvre d'un projet de dépollution ainsi que les critères d'éligibilité au Fonds de dépollution.**

### **PERENNITÉ DES RESULTATS DU PROJET**

Le projet a été accompagné de mesures à la fois législatives, institutionnelles et économiques de nature à approfondir et enraciner les résultats obtenus. Notamment les actions suivantes sont de nature à garantir la pérennité des résultats du projet.

#### **Actions du Ministère de l'Aménagement du Territoire et de l'Environnement**

- Promulgation d'une nouvelle loi sur la protection de l'environnement dans le cadre du

développement durable

- Promulgation d'une nouvelle loi sur la gestion des déchets
- Promulgation d'une loi sur les risques majeurs où l'aspect risques industriels et énergétiques est pris en considération
- Introduction d'instruments économiques à travers différentes lois de finances pour inciter les acteurs économiques à un comportement plus responsable vis-à-vis de l'environnement
- Mise en place de réseaux de mesure de la qualité de l'air à Annaba et Alger
- Mise en place de laboratoires et de station de surveillance des milieux
- Création d'agences chargées de catalyser le développement d'aspects importants de la gestion de l'environnement.
- Préparation et signature avec plusieurs entreprises industrielles de contrats de performance environnementale

### **Actions développées par ASMIDAL**

- Financement sur ses propres ressources d'investissements à caractère environnemental (ex : unité nitrate d'ammonium)
- Mise en place d'un réseau de mesure des émissions polluantes
- Mise en place d'une politique de communication relative à ses initiatives environnementales
- Mesures préliminaires pour la mise en place d'un système de gestion environnementale
- Mise en place d'un délégué à l'environnement chargé du suivi de la situation environnementale du complexe.

### **Actions développées par SIDER/ISPAT**

- Programmation de ressources financières pour la réalisation d'investissements environnementaux.
- Mise en place d'un délégué à l'environnement chargé du suivi de la situation environnementale du complexe.

### **ENSEIGNEMENTS TIRÉS**

**Toutes les activités ont été réalisées.** Ces activités ont permis de concrétiser l'objectif assigné

Au delà des résultats physiques le CPI a permis également, par l'apport d'une expertise internationale de haut rang, permettant aux opérateurs algériens de se mettre au niveau de l'éco-technologie moderne mise en œuvre dans les pays avancés

Le projet CPI a permis de cristalliser les efforts du Gouvernement algérien en matière de lutte contre la pollution industrielle. Ce projet a suscité une prise de conscience de la part des autorités et la nécessité d'élargir les instruments à même de limiter les nuisances dues à la pollution industrielle en est la preuve. Ces approches concernent les instruments réglementaires classiques basés sur la limitation des émissions et leur contrôle, les instruments économiques basés sur des

taxes destinés à inciter les générateurs de pollution à modifier leur comportement, et les instruments basés sur l'engagement volontaire des industriels à modifier leurs pratiques et limiter ainsi les nuisances qu'ils génèrent.

Cette dynamique est en train de se développer avec l'approfondissement des instruments existants et de la capacité des pouvoirs publics à faire respecter la réglementation ainsi qu'avec l'introduction d'autres instruments tels ceux basés sur les mécanismes de marché. L'analyse Coût Bénéfice de l'impact du projet fait ressortir des résultats physiques exceptionnels.

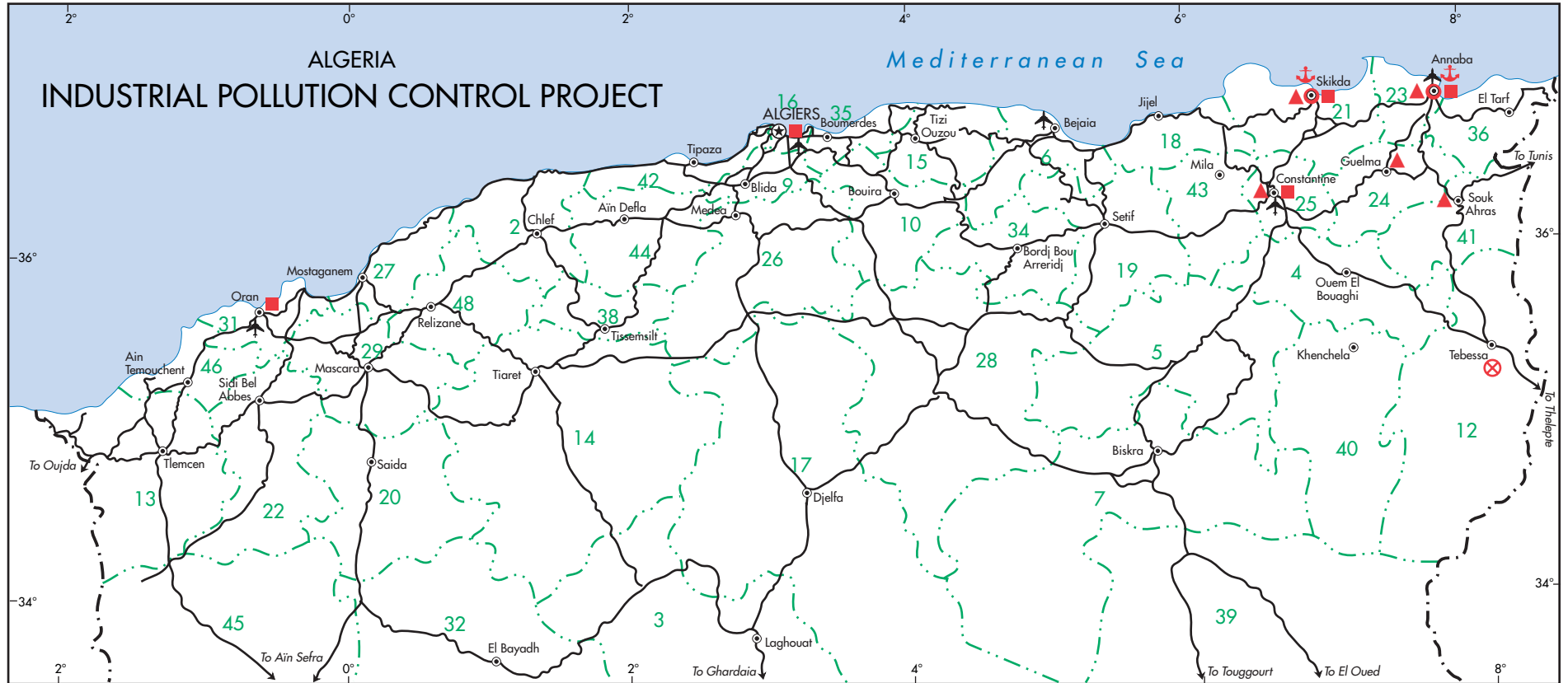
Les impacts du projet ont été enregistrés : bénéfice économique et écologique du Grand Annaba. L'impact essentiel est illustré par la diminution très sensible de la concentration de dioxyde de soufre (SO<sub>2</sub>) dans l'air, notamment au niveau d'El Bouni, (l'investissement au niveau de l'unité acide nitrique a également contribué à cet effet). De plus, un autre résultat environnemental important est également dû à cette mesure, à savoir l'arrêt du déversement du phosphogypse issu de la production de l'acide phosphorique.

L'impact économique du projet dans la région de Annaba peut se résumer à la conclusion que sur la base de tous les bénéfices (santé publique, écologiques, financiers à travers l'impact sur la rentabilité des entreprises concernées et de l'impact sur la valeur du patrimoine foncier), pour chaque dollar investi, le projet a permis de générer un bénéfice net de près de 6 dollars. Concernant les bénéfices liés aux coûts évités de santé, chaque dollar investi a permis de faire un bénéfice net de 1.7 dollars.

### ***Autres bénéfices non monétarisés***

Outre les bénéfices identifiés et valorisés ci-dessus, le projet a permis également d'atteindre de nombreux autres résultats très importants :

- Amélioration de la situation écologique au niveau de la baie de Annaba (L'augmentation de la prise de poissons peut être considérée comme une approximation par défaut de ce résultat) contribuant ainsi à l'augmentation du capital naturel de la région et du pays.
- Amélioration de la capacité de gestion de la pollution industrielle aux niveaux local et national, contribuant ainsi à l'augmentation du capital humain de la région et du pays
- Mise en place d'un réseau automatique de mesure de la qualité de l'air, contribuant ainsi à l'augmentation du capital matériel et physique de la région et du pays
- Bénéfices économiques du fait de l'augmentation de la valeur (goodwill) des entreprises concernées du fait de leur engagement environnemental, contribuant ainsi à l'augmentation du capital financier de la région et du pays.
- Amélioration de la confiance entre la population et l'Etat du fait de la prise en charge effective d'un problème qui affectait la santé de la population, contribuant ainsi à l'augmentation du capital social au niveau de la région et du pays.



#### WILAYA NAMES

1 ADRAR	32 EL BAYADH	30 OUARGLA
44 AIN DEFLA	39 EL OUED	4 OUM EL BOUAGHI
46 AIN TEMOUCHENT	36 EL TARF	48 RELIZANE
16 ALGIERS	47 GHARDAIA	20 SAIDA
23 ANNABA	24 GUELMA	19 SETIF
5 BATNA	33 ILLIZI	22 SIDI BEL ABBES
8 BECHAR	18 JIJEL	21 SKIKDA
6 BEJAIA	40 KHENCHELA	41 SOUK AHRAS
7 BISKRA	3 LAGHOUAT	11 TAMANGHASSET
9 BLIDA	29 MASCARA	12 TEBESSA
34 BORDJ BOU ARRERIDJ	26 MEDEA	14 TIARET
10 BOUIRA	43 MILA	37 TINDOUF
35 BOUMERDES	27 MOSTAGANEM	42 TIPAZA
2 CHLEF	28 MSILA	38 TISSEMSILT
25 CONSTANTINE	45 NAAMA	15 TIZI OUZOU
17 DJELFA	31 ORAN	13 TLEMCEEN

- PROJECT LOCATIONS FOR POLLUTION CONTROL
- ▲ HAZARDOUS WASTE COLLECTION
- ⊗ HAZARDOUS WASTE TREATMENT FACILITY CORRESPONDING TO COMPONENT A-2 OF THE PROJECT
- INSTITUTIONAL DEVELOPMENT
- ⚓ PORTS

- PAVED NATIONAL ROAD
- ✈ AIRPORTS
- ⊙ WILAYA HEADQUARTERS
- ★ NATIONAL CAPITAL
- - - WILAYA BOUNDARIES
- - - INTERNATIONAL BOUNDARIES

0 50 100 150  
KILOMETERS

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